

## REMARKS

The Office Action of November 18, 2002, has been carefully considered.

It is noted that the drawings are objected to for containing various informalities.

Claim 16 is objected to for containing various informalities.

Claims 1-3 and 5 are rejected under 35 USC 102(b) over the patent to Fannon, et al. '382.

Claims 1, 2, 5, 6 and 14 are rejected under 35 USC 102(b) over German reference BD 15 31 406 (applicants believe the Examiner intends GB 15 31 406).

Claim 4 is rejected under 35 USC 103(a) over Fannon, et al. '382 in view of the patent to Fannon '955.

Claims 7-9, 15 and 16 are rejected under 35 USC 103(a) over Fannon, et al. '382 in view of the patent to Hoegler, et al.

Claims 10 and 11 are rejected under 35 USC 103(a) over Fannon, et al. '382 in view of the patent to Baschant, et al.

Claim 12 is rejected under 35 USC 103(a) over Fannon, et al. '382 in view of the patent to Hennecke, et al.

Claim 13 is rejected under 35 USC 103(a) over Fannon, et al. '382.

In connection with the Examiner's objection to the drawings applicants have enclosed herewith a Letter With Proposed Drawing Changes in which Figures 1 and 2 are proposed to be changed to correct the lead lines for the various reference numerals to delete the small circles which appear. It is respectfully submitted that no new matter is added by these changes. Upon approval of these changes and the determination of allowable subject matter applicants will attend to making corresponding changes to the formal drawings.

In view of these considerations it is respectfully submitted that the objection to the drawings is overcome and should be withdrawn.

In view of the Examiner's objection to claim 16, applicants have amended claim 16 to correct the spelling of "ratio".

In view of these considerations it is respectfully submitted that the objection to claim 16 as containing informalities is overcome and should be withdrawn.

In view of the Examiner's rejections of the claims over the prior art, applicants have amended independent claim 1.

It is respectfully submitted that the claims now on file differ essentially and in an unobvious, highly advantageous manner from the constructions disclosed in the references.

Turning now to the references, and particularly to the patent to Fannon, et al. '382, it can be seen that this patent discloses a double wall infrared emitter. As seen in Figures 4 and 6 of Fannon, et al. '382, the emitter 10 has a tubular quartz envelope 12 that encloses a wire filament 18, and is enclosed in an outer sheath 14. A cooling fluid can be forced through the inner space 52 between the tubular quartz envelope 12 and the outer sheath 14. A reflective coating 54 is applied to an outer surface 56 of the outer sheath to reflect the infrared rays emitted by the wire filament 18. As can be seen in Figure 4, the reflective surface of the coating 54 does not describe a closed line that is completely around the surface as in the presently claimed invention.

In Fannon, et al. '382 the coating 54 allows an opening as a longitudinal window 58 along the outer sheath 14. Using this arrangement, all of the cooling fluid is irradiated with infrared rays. In most regions of the reflective coating 54, the infrared rays must pass through the coolant in the space 52 at least two times on their way from the filament 18 to the reflective coating 54 and then back again to the window 58. In high energy concentrations the coolant would be heated up tremendously. Fannon, et al. '382 do not disclose a coolable infrared radiator element having a metallic reflector, when seen in cross section, that describes a closed line completely around a surface, as in the presently claimed invention, nor do they disclose an opening in a region of this surface for the passage of liquid coolant through the reflector.

In view of these considerations it is respectfully submitted that the rejection of claims 1-3 and 5 under 35 USC 102(b) over the above-discussed reference is overcome and should be withdrawn.

British reference GB 15 31 406 discloses an infrared radiating member which, as seen in Figure 2, has a reflective layer 12 applied to a portion of the outer surface of the transparent tube 1, which reflects the infrared rays emitted by the heat-generating filament 5. The reflective layer 12 does not describe a closed line completely around a surface, as in the presently claimed invention. Furthermore, this reference does not disclose an opening provided in a region the

liquid coolant through the metallic reflector, as in the presently claimed invention. In the reference, all the coolant in the chamber 4 is irradiated by the infrared rays. In most regions of the reflective layer 12 the infrared rays have to pass through the coolant at least two times on their way from the filament 5 to the reflective layer 12 and then back again to the filament 5. As with Fannon, et al. '382, when using high energy concentrations the coolant would be heated up to an extreme extent. GB 15 31 406 does not disclose a radiator element having a metallic reflector which, when seen in cross-section, describes a closed line completely around a surface, as in the presently claimed invention.

In view of these considerations it is respectfully submitted that the rejection of claims 1, 2, 5, 6 and 14 under 35 USC 102(b) over the above-discussed reference is overcome and should be withdrawn.

As for the remaining references which were cited against various of the dependent claims in combination with Fannon, et al. '382, these references have also been considered. Since they do not come close to the currently claimed subject matter than the references discussed above it is believed that any detailed comments thereon at this time would be superfluous. Applicants submit that none of the additional references teach a metallic reflector which describes a closed line completely around the surface as in the independent claim.

invention. Furthermore, this reference does not disclose an opening provided in a region the surface around which the reflector describes a closed line, for passage of at least some of the liquid coolant through the metallic reflector, as in the presently claimed invention. In the reference, all the coolant in the chamber 4 is irradiated by the infrared rays. In most regions of the reflective layer 12 the infrared rays have to pass through the coolant at least two times on their way from the filament 5 to the reflective layer 12 and then back again to the filament 5. As with Fannon, et al. '382, when using high energy concentrations the coolant would be heated up to an extreme extent. GB 15 31 406 does not disclose a radiator element having a metallic reflector which, when seen in cross-section, describes a closed line completely around a surface, as in the presently claimed invention.

In view of these considerations it is respectfully submitted that the rejection of claims 1, 2, 5, 6 and 14 under 35 USC 102(b) over the above-discussed reference is overcome and should be withdrawn.

As for the remaining references which were cited against various of the dependent claims in combination with Fannon, et al. '382, these references have also been considered. Since they do not come close to the currently claimed subject matter than the references discussed above it is believed that any detailed comments thereon at this time would be superfluous. Applicants submit that none of the additional references teach a metallic reflector which describes a closed line completely around the surface as in the independent claim.

In view of these considerations it is respectfully submitted that the rejections of claims 4, 7-13, 15 and 16 under 35 USC 103(a) are overcome and should be withdrawn.

Reconsideration and allowance of the present application are respectfully requested.

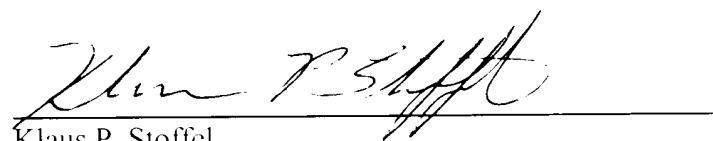
Any additional fees or charges required at this time in connection with the application may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Asst. Commissioner for Patents, Washington, D.C. 20231, on February 19, 2003:

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Name of applicant, assignee or  
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Date of Signature

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Respectfully submitted,

  
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**APPENDIX A**  
**"CLEAN" VERSION OF EACH PARAGRAPH/SECTION/CLAIM**  
**37 C.F.R. § 1.121(b)(ii) AND (c)(i)**

**CLAIMS (with indication of amended):**

1. (Amended) A coolable infrared radiator element of quartz glass, comprising:  
at least one heating tube, which has a gas-tight current lead-through at each of its two ends;  
a long, stretched-out electrical heating conductor provided in the heating tube to serve as a radiation source;  
at least one cooling element, which has at least one cooling channel for a liquid coolant; and  
a metallic reflector in a region of the heating conductor, the metallic reflector having at least one reflective surface which, when seen in cross section describes a closed line completely around a surface, an opening for passage of at least some of the liquid coolant through the metallic reflector being provided in a region of this surface.
  

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16. (Amended) An infrared radiator element according to claim 15, wherein the heating conductor is coiled and has a coil diameter so that a ratio of the coil diameter to an inside diameter of the heating tube is at least 1:3.

**APPENDIX B**  
**VERSION WITH MARKINGS TO SHOW CHANGES MADE**  
**37 C.F.R. § 1.121(b)(iii) AND (c)(ii)**

**CLAIMS:**

1. (Amended) A coolable infrared radiator element of quartz glass, comprising:  
at least one heating tube, which has a gas-tight current lead-through at each of its two ends;  
a long, stretched-out electrical heating conductor provided in the heating tube to serve as a radiation source;  
at least one cooling element, which has at least one cooling channel for a liquid coolant; and  
a metallic reflector in a region of the heating conductor, the metallic reflector having at least one reflective surface which, when seen in cross section describes a closed line completely around a surface, an opening for passage of at least some of the liquid coolant through the metallic reflector being provided in a region of this surface.
  
16. (Amended) An infrared radiator element according to claim 15, wherein the heating conductor is coiled and has a coil diameter so that [radio] a ratio of the coil diameter to an inside diameter of the heating tube is at least 1:3.